Individual Values and Household Finances

[1], Fabian Gogolin[1], Michael Dowling[2] and Mark Cummins*[3]

[1]Queen's Management School, Queen's University Belfast
[2]Rennes School of Business
[3]DCU Business School, Dublin City University

Abstract

We create individual cultural values measures for households and show that this is an important determinant of their financial behavior. To date, personal cultural values have only been indirectly measured through religion and trust. But these are, at best, an approximation of true cultural values. Applying a holistic framework from the World Values Survey (WVS), we create individual measures of cultural values, and show that the self-expression values of this framework are positively associated with a households' financial decisions. Examining the individual cultural values that make up the WVS model, we further show that happiness, trust, and playing an active role in society, are individually important determinants of household financial decision-making. Our study shows that cultural values can be brought from a generalized national level to the individual level in order to improve our understanding of household financial decision making.

Keywords: household finance, cultural values, religion, World Values Survey
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1 Introduction

Cultural values matter. They shape and define our attitudes and behavior (Allport et al., 1960; Davidov et al., 2008; Sagiv and Schwartz, 1995) and have been shown to deeply affect the social, political and cultural aspects of everyday life and approaches to decision-making (Rokeach and Ball-Rokeach, 1989; Williams, 1968). However, to date, the role of such values has not been directly tested in financial decision-making. In this paper we progress research on cultural values, by utilizing a novel dataset which allows us to approach a holistic understanding of cultural values influences at the level of the individual and connect this to financial decision-making. We show that these individualized cultural values measures do indeed explain part of the financial behavior of households.

Increasingly, researchers have recognized that household financial decisions are influenced not only by thoughts of rational choice, but also by the personal aspects of a person's life. Accordingly, we have begun to consider factors that lie outside the scope of traditional economic models. For example, recent research has identified the importance of factors such as optimism (Puri and Robinson, 2007), cognitive abilities (Christelis et al., 2010), personality (Brown and Taylor, 2014), mental budgeting (Antonides et al., 2011) and financial literacy (Van Rooij et al., 2011).

Understanding how the financial behavior of individuals and households is related to cultural values and value change is of interest to financial practitioners and policy makers alike. Both savings and investment decisions have well-known policy implications (Brown et al., 2008; Hong et al., 2004; Thaler, 1994). Stock market participation, for example, influences the size of the equity premium (Brav et al., 2002)

and is highly relevant for public policies such as divided tax policy and pension contributions (Abel, 2001). Given that culture affects so many aspects of personal life, it follows that gaining a deeper understanding of the influence of cultural values on the household could help improve education and policies aimed at better financial decision-making. Adding understanding of the influence of cultural values can improve the information set policy makers have available when deciding how to target and design educative programs. For example, by enabling the tailoring of programs aimed at certain groups within a society cognizant that their values framework partially determines how they approach financial decision making.

The difficulty faced by researchers interested in the application of culture to finance, however, is how best to approximate or measure culture. In finance, the effect of culture is predominantly studied using broad and often one-dimensional variables; primarily trust (Georgarakos and Pasini, 2011; Guiso et al., 2008) and religion (Kumar et al., 2011; Renneboog and Spaenjers, 2012).

Guiso et al. (2008) and Georgarakos and Pasini (2011) approximate culture using a binary variable from the World Values Survey (WVS) that classifies individuals as either generally trusting or not. The authors are able to show that trusting individuals are significantly more likely to invest in the stock market. However, attempting to capture cultural influence using a binary variable like trust, by definition, severely limits the degree to which individuals or households can be culturally distinct. A deeper problem is that trust is just a component of an overall cultural values framework, rather than a comprehensive values system by itself.

Ditz (1980) first advocated for the role of religion in influencing economic behavior. He argued that the Protestant ethos inspired economical living which in turn

led to greater opportunity for saving and investment. More recently Renneboog and Spaenjers (2012) and Kumar et al. (2011), apply a religion-as-cultural-values proxy to investigate whether religion is associated with household financial behavior. The authors show that values associated with the Catholic or Protestant faith have an identifiable influence on financial behavior. However, religion has several limitations as a measure of culture. Firstly, it is difficult to determine which of the values associated with Catholic or Protestant belief are the drivers of the observed differences in risk aversion and financial behavior. Protestant work ethic, for example, has been connected with a higher willingness to save and the rejection of excessive consumption (Arruñada, 2010). But this is just one of many possible explanations of how religious beliefs are related to financial behavior. Determining which aspects of religious values actually drive financial decision-making is difficult. Also, several recent studies have highlighted that the economic effects of religion are, at least to some extent, country-specific. Kumar et al. (2011) and Shu et al. (2012) find that in the U.S. Catholics or firms in Catholic regions are less risk averse than Protestants. Renneboog and Spaenjers (2012), however, find the opposite in their Netherlands study where Catholics are shown to be more risk averse than Protestants.

The apparent lack of generality of the results might be due to cultural differences between religious groups being often less significant within a given country, than they are across countries. Inglehart and Baker (2000) find that the value orientations of Catholics and Protestants within the Netherlands are more closely aligned than the value orientations of Catholics in the Netherlands and Catholics in the United States.

A last more general point is that religiosity has declined as a feature of many

developed societies[1], so the ongoing benefit of this approximation of cultural values is questionable. For example, only 37% of respondents in our (Dutch) dataset professed any religious beliefs.

Thus, cultural studies to date have identified individually important cultural components such as trust or religion in terms of how households make economic decisions, but at the same time have failed to integrate them into a comprehensive values framework that draws on a more holistic picture of how individuals or households differ culturally. Following from this, we argue that a closer focus on such a comprehensive cultural values framework is likely to lead to better understanding of the role of culture in economic behavior.

By cultural values we take as a definition: "an enduring belief that a specific mode of conduct or end-state of existence is personally and socially preferable to an opposite or converse mode of conduct or end-state of existence" (Rokeach, 1973). More generally, values are understood as guiding principles of life, which are relatively stable over time and part of a dynamic system of inherent contradictions (Inglehart, 1997; Schwartz, 1999).

Values exist in the form of cultural, societal and institutional, organizational and individual values (Rokeach and Ball-Rokeach, 1989). All societal institutions, whether educational, economic, political or religious express value priorities of some form. These values are then implicitly and explicitly imparted on members of society through customs, laws, norms and practices (Inglehart, 1997; Inglehart and Baker, 2000). Thus cultures, whether national, regional or local, can be identified by their shared values and attitudes. Values are imparted on individuals through all societal

[1]The decline is expected to continue, with one estimate from the Pew Research Center suggesting nearly 100 million less Christians in Europe by 2050 compared to 2010 (Hackett et al., 2015)

institutions, determine attitudes and behavior and affect the social, political and cultural aspects of everyday life (Rokeach and Ball-Rokeach, 1989; Williams, 1968).

There are three dominant cultural values frameworks: (1) Hofstede's value dimensions (Hofstede, 1980), (2) Schwartz's theory of basic human values (Schwartz, 1992, 1999), and (3) Inglehart's World Values Survey theory of value change (Inglehart, 1971, 1977, 1997). While these are distinct frameworks, several studies have pointed out commonalities between the three approaches (Datler et al., 2013; Inglehart and Oyserman, 2004).

Both Hofstede and Schwartz frameworks have been extensively studied in the area of financial economics. A sample of areas of study include corporate finance (Li et al., 2013), asset pricing (Chui et al., 2010) and international asset allocation (Siegel et al., 2011). A problem with the theories of Hofstede and Schwartz is that they are explicitly country-level values frameworks, thus the finance studies cited above are all cross-country investigations. Au (1999) and Tung (2008), amongst others, have criticized the reliance on cross-country measures of cultural variation, and highlight the need for ways to measure within-country cultural variation. The third framework by Inglehart explicitly offers itself as compatible with such aims, with Inglehart and Baker (2000) demonstrating that the framework, which accounts for 44% of cross-national cultural variation, also accounts for 26% of individual-level variation.

Our study therefore constructs the cultural profile of individual households using the value theory of Inglehart. This theory, which is strongly empirically supported by the World Values Survey (WVS) conducted across 100 societies representing more than 90 percent of the world population, is based on two value dimensions which

reflect polarizations between *traditional* versus *secular-rational* orientations towards authority and *survival* versus *self-expression* values.

The traditional vs. secular-rational dimension reflects an individuals or a society's orientation towards authority. Traditional households place much importance on the family, deference to God and respect for authority. In respect to specific value orientations, individuals at the traditional end of the dimension reject divorce, and view issues like abortion, euthanasia and suicide, as unacceptable. In traditional households politics are rarely or never a topic of discussion and social conformity is emphasized rather than individualistic striving. Societies and individuals that emphasize secular-rational values have opposite preferences on all of these topics (Inglehart and Baker, 2000).

The survival vs. self-expression dimension taps topics such as trust, tolerance, subjective well-being, political activism and self-expression. Central to the survival vs. self-expression dimension are also differences between those that emphasize materialistic rather than post-materialistic values. These values are characteristic of a cultural shift documented throughout industrial societies. As individuals or societies increasingly move towards self-expression values, survival is taken for granted and cultural and ethnic diversity are no longer viewed as threatening. Similarly, changing gender roles, equal rights for homosexuals, non-natives, and other traditional 'out-groups', tend to be rejected in survivalist societies and accepted in self-expressive societies (Inglehart and Baker, 2000).

Several studies have emphasized the overlap of self-expression values and other widely applied value measures such as the individualism vs. collectivism dimension (Hofstede) and the autonomy vs. embeddedness values (Schwartz) (Datler et al.,

2013; Dobewall and Maksim, 2012; Inglehart and Oyserman, 2004). However, a comprehensive comparative study of both the Schwartz and Inglehart value system by Datler et al. (2013) finds that Inglehart's value dimensions perform better in terms of predicting external variables. The survival values and traditional values of Inglehart can, for example, explain a substantial amount of the variation in church attendance and life satisfaction (Datler et al., 2013).

Given the construction of Inglehart's value dimensions, they can be related to financial behavior in several ways. Family values and the safety of the family are particularly important for traditional households, so this could lead to higher relative risk aversion in traditional households. The higher risk aversion of traditional households might affect the financial behavior of these households, leading them to save money rather than invest. Self-expression values represent a form of social capital associated with higher trust in people and increased participation in society (Welzel, 2010). Both, trust (Guiso et al., 2008) and sociability (Brown et al., 2008; Hong et al., 2004) have been associated with an increased willingness to invest in the stock market. Self-expressive households could therefore show a higher tendency to invest their money. We develop formal hypotheses around this proposed relationship in Section 3.

An advantage we have in this study is that we can directly construct Inglehart dimensions at the individual household level and connect this with the financial decisions of these households. This has not previously been possible. In 2011 the LISS Panel[2] of *centERdata* in Tilburg University, Netherlands, conducted the Netherlands

[2]The LISS Panel, or the *Longitudinal Internet Studies for the Social Sciences* Panel, is an EU-funded internet based project based in Tilburg University where a representative sample of the Dutch population are regularly interviewed on a range of socioeconomic topics.

values survey for the WVS 6th wave[3]. The normal role of the LISS Panel is to conduct monthly surveys of approximately 8,000 Dutch participants, representative of the Dutch population, on all aspects of their lives including their financial decision-making (Scherpenzeel, 2011). Thus we are able to link individual value orientations with economic data, such as household savings and investments.

Two clear limitations with this dataset are that we only have data from one point in time and from one country. Ideally, of course, we would have multiple points in time and be able to test the generalisability of the findings across multiple countries. Unfortunately this data is just not available. While a limitation, the lack of data also suggests that policy makers and researchers have not started to seriously consider the importance of cultural values in economic decision making, perhaps due to the lack of prior research showing this to be important. Thus our study can hopefully act as part of a general impetus to create datasets with comprehensive cultural value measures that can be linked to economic decisions.

The goals of this study are to answer several questions. Do cultural values matter in financial decision-making? What value components are individually important? And finally, how does religion, as an indirect measure of cultural values, perform in comparison? Of secondary interest, we also seek to understand whether there are specific benefits to applying Inglehart's value dimensions to capture the relationship between cultural values and financial decision making.

Our contribution is twofold. First, the study adds to the existing literature on household finance and financial decision-making. It is, to our knowledge, the first study to directly analyze the role of a cultural values framework in household finan-

[3]The survey waves are conducted approximately every five years in order to capture changes in values across the world

cial behavior. It is the first study to show that culture, as matters to economics, can be studied in a more comprehensive and fundamental way through the direct measurement of values. Inglehart's value theory allows us to identify differences in cultural values across households and show that these values are reflected in household financial behavior. Furthermore, we are able to show that a number of the component parts used to construct Inglehart's dimensions are particularly important. A more general contribution is that we highlight the need for economics and finance to integrate holistic concepts and ideas from areas like sociology and psychology, rather than individual components, to gain a better understanding of how culture affects the financial decision-making of individuals and households.

The paper now proceeds to discuss the cultural values, financial, and control data used in the study, variable construction, and empirical strategy; followed by the presentation and analysis of the findings.

2 Data and descriptive statistics

The data basis for this study is the LISS Panel, created and provided by *centERdata* in Tilburg University, Netherlands. The dataset utilized covers the period from 2011-2012. The LISS Panel consists of survey responses from approximately 8,000 Dutch participants, with the participants regularly interviewed on a wide variety of aspects of their lives, including economic and social situations, beliefs, and values. Specific efforts are made to ensure the representativeness of the dataset. For example, participants are paid for their involvement and, where necessary, provided with a computer and Internet access to allow them to answer the regular surveys. Initial

recruitment is carried out through a letter of invitation followed, if required, by a telephone call or a face-to-face interview[4]. The LISS Panel has been used to explore a variety of economic and social issues, such as labor supply (Cherchye et al., 2012), mental health (Westerhof and Keyes, 2010), health insurance (von Ophem and Berkhout, 2012), and perceptions of equity market efficiency (Kaplanski et al., 2015)[5].

The data provided by the LISS Panel is divided into eleven categories of which three are used in this study: (i) Background Variables; (ii) Economic Situation: Assets and (iii) Economic Situation: Income. In addition we use the WVS LISS Panel dataset, as the WVS 6th wave for the Netherlands was conducted by the LISS Panel in the period 2011-2012, and can therefore be linked to financial and demographic data from the original LISS Panel for the same time period.

For each household, we collect data for the individual labeled as the financial decision maker. If more than one member reports himself or herself to be in charge of financial matters, we pick the one that reports to be the head of the household.

Three different financial decisions are considered as dependent variables: whether the individual household has saved money (*saved*), invested in risky assets (*investments*), and finally we consider the percentage of total assets invested in risky assets (*%investments*)[6]. The focus on savings and investment is because these are two of the primary financial decisions of households (Campbell, 2006; Renneboog and Spaenjers, 2012).

[4]For more technical details on the construction of the dataset, see Scherpenzeel (2011)

[5]A complete list of the many publications using Liss Panel data is available at: http://www.lissdata.nl/dataarchive/publications

[6]The number of observations for the investment data is limited because the question is often left blank. The survey tries to encourage people to give at least approximate answers by offering categories if the questions is left blank.

We also include a variety of demographic control variables. We control for the age of the household (*age*), as well as an age-squared term to capture non-linear age influences, whether the financial decision maker is male or female (*male*), whether they have a partner (*partner*), and how many children live in the household (*children*). We also include variables that control for the type of employment carried out by the financial decision maker. Specifically we include dummy variables to proxy for whether they are self-employed (*self employed*) and whether or not the individual is retired (*retired*). Additionally, we use a control variable for whether they have a university degree (*university*). Finally, we include two variables that account for differences in income and net worth. We include the natural logarithm of the total net income of the household (*ln(income)*) and the natural logarithm of the household's net worth (*ln(net worth)*). The net worth is calculated as total assets minus total liabilities with zero as a lower bound (Renneboog and Spaenjers, 2012). We also include squared terms of income and net worth to capture non-linear effects. Definitions of all variables are in Table 1b.

Descriptive statistics of the data are presented in Table 2. Reported are the number of observations initially available for each variable, mean, standard deviation, minimum, median and maximum. We can see that approximately 54% of the households included in our analysis managed to save money in the last year and about 16% of all households invested in risky assets of some form. The respondents are equally divided between male and female with an average age of approximately 40 years.

2.1 Inglehart dimension construction

Inglehart's value dimensions are constructed following the approach in Inglehart and Welzel (2005) and is based on ten values obtained from the WVS. These distinct values cover various topics. Namely, we include the importance of God (*god*), an autonomy index (*autonomy*), attitudes towards abortion (*abortion*), national pride (*pride*), respect for authority (*authority*), a materialism-postmaterialism index (*materialism*), an indicator of an individual's unhappiness (*unhappy*), attitudes towards homosexuality (*homosexuality*), willingness to sign a petition (*petition*) and an indicator of interpersonal trust (*trust*). Definitions of each of these values and details on how they are constructed is contained in Table 1a.

Using these values, we calculate factor loadings for Inglehart's two value dimensions, traditional vs. secular-rational (*tradsec*) and survival vs. self-expression (*survself*)[7]. The factor loadings reported in Table 3 are based on a principal component analysis, missing data were deleted pairwise, and the number of factors was fixed at two. The resulting factor loadings were subject to a varimax rotation (Datler et al., 2013). The distribution of scores along the two value dimensions, traditional vs. secular-rational and survival vs. self-expression, is displayed in Figure 1.

The two extracted factors explain 36% of the within-country cultural variation among households in our sample. By comparison, the factors reported in Inglehart and Baker (2000) account for 44% of cross-national variation, and 26% of individual-level variation. Although this analysis is carried out across 100 countries, and our study is confined to a sample of about 1,800 Dutch participants. Our study is also

[7]Following Inglehart and Baker (2000), we use 10 items to construct the dimensions instead of the originally proposed 22 items (Inglehart, 1997). Inglehart and Baker (2000) show that the dimensions can be accurately constructed from this reduced list of 10 items. More details on the construction of the two value dimensions can be found in the Internet Appendix of Inglehart and Welzel (2005).

based on a more recent wave of the survey. This possibly explains why the factor loadings in our study are close to, but do not perfectly replicate, the explanatory power found in Inglehart and Baker (2000). Jagodzinski (2010) carries out a similar analysis for a variety of countries and shows that the loadings vary significantly from country to country. The 36% explanatory power in our sample, is also very similar to the 37% that Datler et al. (2013) find for their German sample.

3 Empirical strategy

We analyze household financial behavior in three steps. First, we analyze whether Inglehart's two overall value dimensions affect household financial decision-making. Second, we individually test each of the ten values used to construct the value dimensions. Thereby, we hope to identify which values are individually important to a household's financial behavior. Finally, we test how religion, as an indirect proxy for cultural values, compares to our cultural values framework. Each test is carried out in respect to the three dependent variables *saved*, *investments* and *%investments*.

We first investigate the degree to which the two extracted dimensions relate to household financial decision-making. We estimate the following model:

$$Y_i = \alpha_0 + \beta_1 tradsec_i + \beta_2 survself_i + \beta_3' controls_i + \varepsilon_i \tag{1}$$

where the dependent variable Y_i is a financial decision-making variable (*saved*, *investments*, *%investments*). We separately regress each of the dependent variables on *tradsec* which represents the first extracted factor, the traditional vs. secular-rational dimension; *survself*, the survival vs. self-expression dimension; and a vector of control variables for each household. α_0 represents the constant and ε_i the error term.

Following Renneboog and Spaenjers (2012) we estimate a probit model for the binary variables *saved* and *investments* and a tobit model for the variable *%investments*.

Our hypotheses of expected behavior to be observed in this testing are necessarily tentative. For the traditional-secular rational dimension we suspect that there will be greater risk aversion in traditional households, leading them to save money rather than to invest. This fits with the Renneboog and Spaenjers (2012) finding that religious households are more risk averse and more likely to save. Our households on the traditional end of the dimension consider religion particularly important. We therefore expect they will have higher than average savings due to desire for safety and lower than average risky investments due to risk aversion, leading to the following hypotheses.

> **H1:** Households situated on the traditional side of the traditional-secular-rational cultural values dimension will have higher than average savings.
>
> **H2:** Households situated on the traditional side of the traditional-secular-rational cultural values dimension will have lower than average investment in risky assets.

We have a stronger expectation for the survival vs self-expression dimension, as we know that a number of the component factors used in constructing this dimension are positively associated with improved financial behavior. For example, both trust (Guiso et al., 2008) and sociability (Brown et al., 2008; Hong et al., 2004) are associated with an increased willingness to invest in the stock market. We therefore expect self-expressive households to demonstrate more proactive financial behavior and thus higher levels of saving for the future - both in terms of savings and investment in risky assets. The hypotheses are:

H3: Households situated on the self-expressive side of the survival-self-expressive cultural values dimension will have higher than average savings.

H4: Households situated on the self-expressive side of the survival-self-expressive cultural values dimension will have higher than average investment in risky assets.

We also analyze the degree to which the individual values which make up the two dimensions are associated with a household's financial decision-making. The following model is estimated:

$$Y_i = \alpha_0 + \beta_1 values_i + \beta_2' controls_i + \varepsilon_i \tag{2}$$

where the dependent variable Y_i is one of the financial decision-making measures. We separately regress each of the dependent variables on *god*, *autonomy*, *abortion*, *pride*, *authority*, *materialism*, *unhappy*, *homosexuality*, *petition*, and *distrust* and a vector of control variables for each household. Once again we estimate a probit model for *saved* and *investments* and a tobit model for the variable *%investments*. The variables enter the regression analysis coded in the same way as defined in Inglehart and Baker (2000)[8]. We don't make formal hypotheses around these individual values, but have a reasonable expectation that they will follow the same pattern as that seen for the overall dimension they are part of.

Finally, we test whether a household's religious denomination is associated with their financial behavior:

$$Y_i = \alpha_0 + \beta_1 catholic_i + \beta_2 protestant_i + \beta_3' controls_i + \varepsilon_i \tag{3}$$

[8]The variables *abortion*, *homosexuality* and *distrust* are coded in a way that is counterintuitive. Abortion, for example, reflects households' 'disapproval' of abortion. Homosexuality and distrust are coded in a similar way. For more details, see Table 1a.

where the dependent variable Y_i is one of the financial decision-making measures. We separately regress each of the dependent variables on the two religion dummy variables (*catholic* and *protestant*) and the aforementioned control variables for each household. The dummy variable *catholic*, for example, is equal to 1 if the household head reports to be Catholic and 0 otherwise. We follow the same estimation process as in the prior tests.

4 Results

Before we begin our main analysis, we ensure that the constructed value dimensions, traditional vs. secular-rational and survival vs. self-expression, are not related to underlying demographics in a systematic way. According to Inglehart (1997), self-expression values are associated with high levels of economic and physical security. This could mean that self-expressive households are, on average, better off financially, have better educational opportunities and as a result have higher paying jobs. Equivalently, Datler et al. (2013) show that traditional values are more commonly found among older individuals. Again, this could bias our results. Households that are further advanced in their life-cycle, for example, differ considerably in their financial goals and needs and, consequently, in their financial decision-making. Although it should be noted that these findings are based on cross-national characteristics.

To address these concerns, we analyze the distribution of our demographic and financial control variables across quartiles. Therefore, we divide the households in our sample into quartiles according to their respective score on each value dimension. Thus, for example, we compare how households scoring in the highest quartile on

self-expression values compares to those in the lowest quartile. The results which are reported in Table 4 include the control variables of *age*, *self-employed*, *university*, *ln(income)*, and *ln(net worth)*, and do not show any unusual patterns for these variables across the quartiles. This suggests that households can be differentiated according to their values and value orientations, irrespective of their demographic and financial situation.

4.1 Value Dimensions

In this section we analyze the relationship between the traditional vs. secular-rational (*tradsec*) and survival vs. self-expression (*survself*) value dimensions and financial decision-making. The results of our main analysis are reported in Table 5. We report three sets of results for each of the three financial dependent variables (*saved*, *investments*, *%investments*). First, we report coefficient estimates for just our two values dimensions. Second, we report estimates for the full model including value dimensions and control variables except financial control variables. Finally, we estimate results including the value dimensions and all control variables. Excluding income and net worth in the second regression allows us to significantly increase the number of available observations compared to the last regression and overcomes the reticence of households to answer questions regarding their financial situation.

We begin the analysis by investigating a household's decision to save. The main finding is that survival vs. self-expression values can, controlling for household-specific demographic variables and risk factors, explain substantial differences in the behavior of households. Our results show that the survival vs. self-expression dimension and the values associated with it, are important determinants of a households'

decision to save, with higher savings in households higher on the self-expression dimension. This relationship is significant at the 1% level. When we examine marginal effects (Williams et al., 2012), we find that a one-unit increase in the survival vs. self-expression dimension increases the probability of having saved money by 9% for an average household. On the other hand, we find no evidence that values associated with the traditional vs. secular-rational value dimension have an effect on a household's decision to save.

When we exclude the financial variables of income and net worth we find that both dimensions are positively associated with a household's willingness to save money. Marginal effects tests show that a one-unit increase in the self-expression dimension is associated with an increase in the probability of having saved of about 7% for an average household. Self-expression values are highly significant, and the traditional values are also important but only at the 10% level. Overall this indicates support for Hypothesis 3 that states households situated on the self-expression side of the survival vs self-expression dimension will save more, but there is a lack of support for Hypothesis 1 that expects households situated on the traditional side of the tradition vs secular-rational to also save more.

The importance of including the cultural values dimensions in the model is confirmed when we test whether the effect of both traditional vs. secular-rational and survival vs. self-expression values is jointly equal to zero. We find convincing evidence that, for the full and the restricted model, both value dimensions significantly differ from zero ($p<0.001$). Overall, we conclude that self-expression values are an important determinant of the household saving decision.

Next, we analyze whether a household's decision to invest in risky assets (*invest-*

ments) is associated with their values and value orientations. The results for just the culture variables are displayed in column (4), the full model excluding financial controls in column (5) and the full model with all controls in column (6) of Table 5.

We find no indication that values or value orientations are predictive of whether a household owns risky assets. Instead, the financial demographic variables of self-employment and net worth are important explanatory variables of a household's decision to invest; net worth being statistically significant at the 1% level. Our findings are in line with those of Guiso et al. (2008), where the authors show that financial wealth is a highly significant determinant of household behavior in regard to investment decisions. Self-employment and net worth carry a positive sign implying that these factors are associated with a higher willingness to invest in risky assets. Thus there is no support for our hypotheses that self-expressive households will invest more than average (Hypothesis 4) and traditional households will invest less than average (Hypothesis 2).

Finally, in column (7), (8) and (9) we analyze whether values affect the percentage of total assets held in risky assets (*%investments*). Similar to the findings on choosing to invest or not invest in risky assets, we find that the financial variables; income and net worth determine how much a household choses to invest in risky assets. The financial variables are important determinants as the pseudo-R2 decreases from 0.24 to 0.02 upon excluding these measures (column (8) and (9)). We also run additional tests (unreported, but available on request) on the percentage of risky assets invested in for only households that have decided to invest something in risky assets (i.e. excluding non-investors). These results are qualitatively similar to the main percentage of investment findings.

Overall, our evidence suggests that values matter for some aspects of household financial decision-making, with values associated with the survival vs. self-expression dimensions being significant in relation to the household decision to save. The findings with relation to investments, might be due to the definition of this variable in the survey (see Table 1b), where it includes every type of risky asset from mutual funds to stocks to bonds and beyond. A decision to invest in the relative safety of government bonds versus a risky decision to invest in stocks can have a number of different drivers that might have been lost in aggregating these investments. By contrast the decision to save is a more clear cut measure.

Our results around savings are intuitive. The survival vs. self-expression dimension is comprised of values such as trust, tolerance, subjective well-being, political activism and self-expression (Inglehart and Baker, 2000). Trust (Guiso et al., 2008), subjective well-being or happiness (Merkle et al., 2014) and political activism (Bonaparte and Kumar, 2013) have been shown individually to affect financial behavior. We now examine the components of the two value dimensions to determine which of these components are individually important.

4.2 Individual Values

In this section, we individually test the value components of Inglehart's value theory. We separately analyze the effect of these values on savings, investments, and the portion of total assets invested.

Specifically we test the traditional-secular-rational values of: *god*, *autonomy*, *abortion*, *pride*, *authority*; and the survival-self-expression values of: *materialism*, *unhappy*, *homosexuality*, *petition*, and *distrust*. Detailed descriptions of these variables

can be found in Table 1a. The results are presented in Table 6, Table 7, and Table 8. For the sake of brevity we have only reported results for the full model, including all control variables. Excluding the financial control variables did not change the conclusions that can be drawn from our results.

We begin by analyzing household saving behavior. The results are reported in Table 6. In line with the overall dimension findings we see no evidence that values associated with the traditional vs. secular-rational value dimension are individually important. We do, however, find that several of the survival vs. self-expression values are predictive of a households' saving behavior.

In particular, we find that the *unhappy*, *petition*, and *distrust* values are important negative predictors of saving behavior among households, and the *homosexuality* value approaches significance[9]. To interpret these findings we have to take into account that some of the variables are coded in a counter-intuitive way. What our results show is that households that save more, are happy, more likely to sign a petition (an indicator that an individual or household plays an active role in society) and more trusting. For example, the trust variable is coded as a dummy variable with the highest value indicating distrust, so the coefficient of -0.509 means that trusting households are about 51% more likely to have saved money compared to non-trusting households (holding all other coefficients steady). In the same way, each point improvement in happiness on a four-point scale is linked to improved household savings of 40%, and those who have signed a petition are 62% more likely to have savings compared to those who haven't (who in turn are 62% more likely

[9]For clarity; a finding of significance for attitude towards homosexuality would not suggest there is a link between this attitude and savings behavior. Instead the finding would be supportive of an argument that this attitude is indicative of an underlying value system and it is this underlying belief which is related to savings behavior. In our case the underlying value system is captured by the overall value dimensions of the WVS.

to have savings than those who not only haven't but would not sign a petition). The coefficient estimates for *unhappy* and *distrust* are highly statistically significant ($p<0.001$). Our findings are in line with other studies that show that trust and happiness are important determinants of financial decision-making (Guiso et al., 2008; Merkle et al., 2014), but also shows how these variables can be linked as part of a coherent cultural values framework.

With respect to investment decisions, our analysis of individual values confirms our previous findings. Demographic variables such as being self employed and net worth are important. We do not find evidence that individual cultural values are relevant in the investment process. Finally, we analyze the percentage of total assets invested in risky assets. We find a similar pattern, with the exception that income is also an important determinant. However, we also find some evidence that the individual cultural values of *petition* and *autonomy* are important explanatory variables in relation to the percentage invested in risky assets.

4.3 Religion

As noted in the introduction, to date the role of cultural values has primarily been analyzed indirectly through religion. Renneboog and Spaenjers (2012) and Kumar et al. (2011) contrast values associated with Catholics and Protestants and show that values, or more specifically, value differences matter for financial behavior. In this section we test whether the limited prior research using this proxy holds for our sample.

We distinguish between Catholics and Protestants, and test whether there are

significant differences in financial behavior[10]. Historically, the Netherlands were religiously split, with about half the population being Protestant and the other half Catholic. However, since the 1950s the Netherlands have rapidly become one of the most secularized and religiously mixed countries in Europe (Inglehart and Baker, 2000; Renneboog and Spaenjers, 2012). Studying the effect of religion, or those values associated with certain religions, in such a highly secularized country, is therefore not optimal due to the amount of the population that must be excluded. In our sample, only 37% of the households in our sample are religious. About 18% of the individuals in our sample are Catholic, 12% are Protestant and 7% belong to other religious groups. This underlines some of the limitations of religion as a general measure of culture.

Overall our tests find no evidence that religion, as an indirect measure of values is a significant determinant of household financial behavior, neither for savings nor for investments. The results are displayed in Table 9. While our findings provide support to the argument that within countries, cultural influence is best approximated using a values framework, we don't exclude the possibility that the small sample size might be driving the lack of significance.

5 Conclusion

In this study we present a new way to approximate cultural values and apply this to explore the influence of cultural values on household financial decision making. Thus far, researchers have only indirectly tested cultural values through religion, and as

[10]It would have been interesting to test other religious adherents, particularly Muslims due to the strict guidance their religion gives on financial behavior, but the WVS only has a weighting of 2.1% Muslims which means there are too few Muslim households in the sample

we have argued, religion is at best only an approximation of actual values. Thanks to a novel dataset from the LISS panel and WVS we are able to, for the first time, directly test the relationship between a comprehensive cultural values framework and financial decision making.

In particular we address the following questions. Do values matter in financial decision-making? What values are individually important? And finally, we test how a direct approximation of values compares to an indirect approximation through religion.

We find that a cultural values framework, controlling for household-specific demographic variables and risk factors, can explain differences in the financial behavior of households. Our results show that the survival vs. self-expression value dimension is an important determinant of a households' decision to save. Households that emphasize self-expression values are significantly more likely to save money. The results cannot be explained by differences in underlying demographics but instead indicate that there is, indeed, a link between values and financial decision-making.

Next, we show that several of the component values used to construct the survival vs. self-expression dimension are individually important determinants of a households decision to save. In particular, we find that being unhappy, not playing an active role in society, and being distrusting of others are important negative predictors of saving behavior among households. Importantly these individual factors have all been found to be significant determinants of financial decision making in prior research, but haven't been linked together. This suggests the necessity of approaching cultural values through a cultural framework rather than partial proxies for culture.

Finally, we show that religion, as an indirect measure of values, cannot explain the behavior of households in our sample. On the contrary, excluding our cultural framework dimensions in favor of religious variables just increases the importance of demographic and background risk variables. The findings lend support to our argument that cultural values, irrespective of other factors such as religious background, matter in household financial decision-making.

Cultural values represent an unexplored influence on financial decision-making, and is part of a growing body of research showing that factors outside traditional finance models have influence on the behavior of households. While proxies of values have been quite widely studied across countries, the ability to understand the rich influences of cultural values at the individual level offers a range of new research possibilities by enabling the development of more comprehensive, within-country models of how individuals make financial decisions. One major improvement is that within-country models help reduce the model specification issue of endogeneity that has plagued the interpretability and acceptance of cross-country cultural values studies.

Understanding the influence of cultural values at the individual level also has potential future policy implications. Current policies aimed at improving financial behavior either tend to adopt a one-size-fits-all approach (e.g. national ads encouraging everyone to take out a pension), or target demographic subgroups with focused messages (e.g. financial advice targeted by banks at 'lifestages' including marriage, childbirth, retirement). The main opportunity introduced from greater understanding of cultural values is that we should be able to better target subgroups for educative policies to improve financial decision making. For example, a retirement education program aimed at those from culturally traditional subgroups might

speak to the protective decisions they can make, while one aimed at a self-expressive subgroup can tailor a message around the opportunities that retirement financial decisions can bring. In both cases financial decision making is improved, and should be more likely to be acted upon as it speaks directly to the values of the group. This improved tailoring of financial literacy will require much better data to understand the true influence of cultural values on household finances, and remains quite a speculative possibility until further research in the area is carried out.

Figures and Tables

Figure 1: Traditional vs. Secular-Rational and Survival vs. Self-Expression

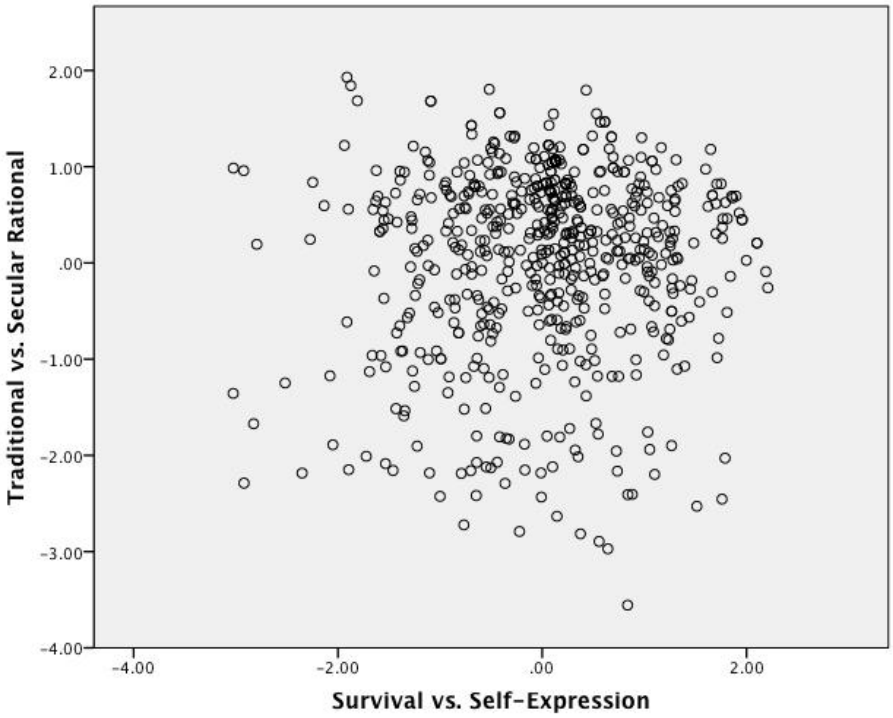

Table 1a: Definition of variables

Variable	Description	Values
Traditional vs. Secular-Rational Values (TRADSEC)		
GOD	Importance of god	'How important is God in your life? Please use this scale to indicate'. 10 means "very important" and 1 means "not at all important". **10-point scale**
AUTONOMY	Autonomy index	'Here is a list of qualities that children can be encouraged to learn at home. Which, if any, do you consider to be especially important? Please choose up to five! Independence (+1); Determination, perseverance (+1), Religious faith (-1), Obedience (-1). **5-point scale**
ABORTION	Disapproval of abortion	'Please tell me for each of the following actions whether you think it can always be justified, never be justified, or something in between, using this card. 1 means "never justifiable" and 10 means "always justifiable". **10-point scale**
PRIDE	National pride	'How proud are you to be [**French**]?' 1 means "very proud" and 5 "not at all proud". **5-point scale**
AUTHORITY	Respect for authority	'I'm going to read out a list of various changes in our way of life that might take place in the near future. Please tell me for each one, if it were to happen, whether you think it would be a good thing, a bad thing, or don't you mind? 1 means "good" and 3 means "Bad". **3-point scale**

(Continued)

Table 1a – Continued

Variable	Variable Name	Description
Survival vs. Self-Expression Values (SURVSELF)		
MATERIALISM	Materialism-postmaterialism index	"People sometimes talk about what the aims of this country should be for the next 10 years. On this card are listed some of the goals which different people would give top priority. Would you please say which one of these you, yourself, consider the most important? (1) Maintaining order in the nation; (2) Giving people more say in important government decisions; (3) Fighting rising prices; (4) Protecting freedom of speech. And which would be the next most important? **3-point scale**
UNHAPPY	Happiness	'Taking all things together, would you say you are:' 1 means "very happy" and 4 means "not at all happy". **4-point scale**
HOMOSEXUALITY	Disapproval of homosexuality	'Please tell me for each of the following actions whether you think it can always be justified, never be justified, or something in between, using this card. 1 means "never justifiable" and 10 means "always justifiable". **10-point scale**
PETITION	Abstaining from signing a petition	'Now I'd like you to look at this card, I'm going to read out some forms of political action that people can take, and I'd like you to tell me, for each one, whether you have done any of these things, whether you might do it or would never under any circumstances do it.' 1 means "have done" and 3 means "would never do". **3-point scale**
DISTRUST	Interpersonal trust	'Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?'. 1 means 'Most people can be trusted" and 2 means "need to be very careful". **2-point scale**

Notes: Table 1a contains the questions used to construct Inglehart's value dimensions. The variables are from the Dutch World Values Survey (WVS) and collected on behalf of the LISS panel. The data is from the period 2011-2012. For more details, see Datler et al. (2013)

Table 1b: Definition of variables

Variable	Description	Values
Religion		
CATHOLIC	Religious denomination	Roman-Catholic =1; other=0
PROTESTANT	Religious denomination	Protestant =1; other=0
Financial variables		
SAVED	During the past year, did you family save money, just get by, spent some savings or spent savings and borrowed money	Save money =1; other=0
INVESTMENTS	Investments (growth funds, share funds, bonds, debentures, stocks, options, warrants, and so on)	yes=1, no=0
%INVESTMENTS	Ratio of Investments to total financial assets	[0,1]
Control variables		
AGE	Year of birth	
MALE	Respondent is male	male=1; female=0
PARTNER	The household head lives together with a partner	yes=1; no=0
CHILDREN	Number of children in the household	
SELF EMPLOYED	Primary occupation of the respondent	{self-employed, free profession, freelance work}=1; other =0
RETIRED	Primary occupation of the respondent	retired=1; other=0
UNIVERSITY	Highest level of education completed	university education=1, other=0
LN(INCOME)	Ln(net income 2011)	
LN(NET WORTH)	Ln(max[0, net worth 2011])	

Notes: Table 1b contains information on the demographic, financial and cultural variables used in this study. The variables are from the LISS panel and the WVS. The data is from the period 2011-2012.

Table 2: Descriptive statistics

Variable	N	Mean	SD	Min	Median	Max
Inglehart Value Dimensions:						
GOD	1809	4.37	3.24	1.00	3.00	10.00
AUTONOMY	1902	0.58	1.05	-2.00	1.00	2.00
ABORTION	1784	4.50	2.97	1.00	4.00	10.00
PRIDE	1830	3.02	0.68	1.00	3.00	4.00
AUTHORITY	1728	0.80	0.40	0.00	1.00	1.00
MATERIALISM	1826	1.10	0.60	0.00	1.00	2.00
UNHAPPY	1884	1.75	0.59	1.00	2.00	4.00
HOMOSEXUALITY	1779	3.10	3.18	1.00	1.00	10.00
PETITION	1894	0.12	0.32	0.00	0.00	1.00
DISTRUST	1866	0.33	0.47	0.00	0.00	1.00
Cultural dimensions						
TRADSEC	1505	0	1.00	-3.56	0.21	1.93
SURVSELF	1505	0	1.00	-4.26	0.08	2.21
Religion						
CATHOLIC	874	0.18	0.38	0.00	0.00	1.00
PROTESTANT	874	0.12	0.32	0.00	0.00	1.00
Financial decisions						
SAVED	874	0.54	0.49	0.00	1.00	1.00
INVESTMENTS	874	0.16	0.37	0.00	0.00	1.00
%INVESTMENTS	874	0.03	0.12	0.00	0.00	1.00
Control variables						
AGE	874	40.16	22.39	18.00	42.00	95.00
MALE	874	0.49	0.50	0.00	0.00	1.00
PARTNER	874	0.80	0.40	0.00	1.00	1.00
CHILDREN	874	1.29	1.29	0.00	1.00	6.00
SELF EMPLOYED	874	0.05	0.22	0.00	0.00	1.00
RETIRED	874	0.15	0.35	0.00	0.00	1.00
UNIVERSITY	874	0.11	0.31	0.00	0.00	1.00
LN(INCOME)	583	9.67	0.76	5.70	9.79	13.64
LN(NET WORTH)	554	9.84	1.76	1.10	9.94	15.91

Notes: Table 2 gives the descriptive statistics. Reported are number of observations, mean, standard deviation, minimum, median and maximum for all variables used in this study. The data is from the LISS panel and the WVS for the period 2011-2012.

Table 3: Constructing value dimensions of individual cultural variation

Variable	Description	TRADSEC	SURVSELF
Secular-rational values indicators:			
GOD	V192 God is very important	0.66	-0.17
AUTONOMY	Y003 Obedience over independence	-0.60	0.15
ABORTION	V204 Abortion is never justifiable	0.79	0.15
PRIDE	V209 R is very proud of nationality	0.21	-0.61
AUTHORITY	V78 High respect for authority	0.24	-0.22
Self-expression values indicators:			
MATERIALISM	Y002 R is materialist	0.34	-0.12
UNHAPPY	V10 R is unhappy	-0.30	0.74
HOMOSEXUALITY	V96 Homosexuality is never justifiable	0.72	0.22
PETITION	V202 R would never sign a petition	0.35	0.01
DISTRUST	V23 Need to be careful in dealing with people	0.28	0.47

Notes: This table gives the factor loadings for each of the 10 items used to construct Inglehart's two value dimensions: traditional vs. secular-rational (*tradsec*) and survival vs. self-expression (*survself*). Also reported are brief descriptions of the variables and code of each variable from the World Values Survey. The factor loadings are based on principal component analysis. Missing data were deleted pairwise, and the number of factors was fixed at two. The factor loadings were subject to a varimax rotation (Datler et al., 2013).

Table 4: Additional descriptive statistics: Value dimensions and demographic variables

Traditional vs. secular-rational

	1st Quartile	2nd Quartile	3rd Quartile	4th Quartile
AGE	39.89	39.42	41.95	39.38
SELF-EMPLOYED	0.06	0.05	0.04	0.05
UNIVERSITY	0.10	0.14	0.10	0.11
LN(INCOME)	9.70	9.73	9.59	9.66
LN(NET WORTH)	9.71	10.11	9.82	9.71

Survival vs. self-expression

	1st Quartile	2nd Quartile	3rd Quartile	4th Quartile
AGE	40.21	39.66	40.01	40.77
SELF-EMPLOYED	0.05	0.07	0.03	0.03
UNIVERSITY	0.11	0.11	0.13	0.10
LN(INCOME)	9.71	9.72	9.59	9.66
LN(NET WORTH)	9.96	9.97	9.76	9.70

Notes: Table 4 gives additional descriptives. The table reports summary statistics for several control variables used in the empirical analysis. Shown are the median, standard deviation and summaries of the first and fourth quartiles for the variables income, net worth, age, university, and self-employed.

Table 5: Value dimensions, savings and investments

	SAVED			INVESTMENTS			%INVESTMENTS		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Value dimensions									
TRADSEC	0.0811*	0.0809*	0.1020	-0.0087	-0.0111	-0.0161	-0.0149	-0.0132	-0.0267
	(1.85)	(1.84)	(1.47)	(-0.17)	(-0.22)	(-0.21)	(-0.48)	(-0.42)	(-0.86)
SURVSELF	0.1890***	0.1900***	0.2470***	-0.0459	-0.0474	0.0801	-0.0333	-0.0356	0.0213
	(4.17)	(4.16)	(3.32)	(-0.88)	(-0.90)	(0.98)	(-0.90)	(-0.96)	(0.55)
AGE		-0.0050	-0.0171		0.0008	-0.0318		0.0010	-0.0114
		(-0.62)	(-0.61)		(0.08)	(-0.98)		(0.16)	(-0.83)
AGE^2		0.0001	0.0002		0.0000	0.0003		0.0000	0.0002
		(0.74)	(0.81)		(0.34)	(0.98)		(0.13)	(1.06)
MALE		0.0487	0.1730		-0.1640	-0.0463		-0.0342	-0.0195
		(0.56)	(1.20)		(-1.58)	(-0.25)		(-0.50)	(-0.25)
PARTNER		-0.0739	-0.1460		0.1180	0.2800		0.0777	0.0162
		(-0.67)	(-0.87)		(0.89)	(1.30)		(0.87)	(0.16)
CHILDREN		-0.0377	0.0265		0.0771	0.0790		0.0384	0.0412
		(-0.92)	(0.39)		(1.57)	(0.98)		(1.22)	(1.18)
SELF-EMPLOYED		0.0641	0.4300		0.2490	0.6550**		0.1500	0.3660***
		(0.31)	(1.40)		(1.11)	(2.06)		(1.06)	(2.70)
RETIRED		-0.1100	-0.2800		0.0422	0.1040		0.0658	-0.0022
		(-0.61)	(-1.01)		(0.20)	(0.31)		(0.50)	(-0.01)
UNIVERSITY		-0.0244	-0.0182		0.1550	0.1460		0.0974	0.0541
		(-0.18)	(-0.09)		(0.95)	(0.60)		(0.91)	(0.52)
LN(INCOME)			-0.8300			-0.3910			-0.4460
			(-0.85)			(-0.27)			(-0.66)
LN(INCOME)^2			0.0456			0.0252			0.0296
			(0.88)			(0.32)			(0.79)
LN(NET WORTH)			0.3110			1.1540**			0.9030***
			(1.13)			(1.97)			(2.87)
LN(NET WORTH)^2			-0.0154			-0.0409			-0.0345**
			(-1.11)			(-1.53)			(-2.47)
N	874	874	359	874	874	359	874	874	359
(Pseudo) R2	0.017	0.020	0.039	0.001	0.012	0.140	0.002	0.011	0.244
$H_0 : T = S = 0$	20.68***	20.57***	13.37***	0.81	0.87	0.99	0.58	0.60	0.53
$H_0 : T = S$	2.94*	2.97*	2.00	0.25	0.24	0.70	0.13	0.19	0.94

Notes: Table 5 gives the results of a multivariate regression analysis. The results for the variables *saved* and *investments* are estimated using a probit model and the results for *%investments* are estimated using a tobit model. The model also includes a constant. Reported are three sets of results for each dependent variable. First, a model including only the cultural dimensions. Second, a model including both value dimensions and control variables except financial controls. Finally, we report results for the full model including all culture and control variables.At the bottom we show the results of a chi-square Wald test on the joint significance and equality of Inglehart's dimensions, traditional vs. secular-rational and survival vs. self-expression. ***, **, and *denote statistical significance at the 1%, 5%, and 10% level, respectively. Standard errors are reported in brackets beneath the coefficient.

Table 6: Values and saving

	SAVED									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
GOD	0.0053									
	(0.25)									
AUTONOMY		-0.0251								
		(-0.40)								
ABORTION			-0.0186							
			(-0.78)							
PRIDE				-0.0857						
				(-0.79)						
AUTHORITY					0.0391					
					(0.23)					
MATERIALIST						-0.1240				
						(-1.08)				
UNHAPPY							-0.3960***			
							(-3.26)			
HOMOSEXUALITY								-0.0392*		
								(-1.73)		
PETITION									-0.6210**	
									(-2.57)	
DISTRUST										-0.5090***
										(-3.37)
AGE	-0.0252	-0.0254	-0.0258	-0.0261	-0.0245	-0.0263	-0.0230	-0.0240	-0.0178	-0.0167
	(-0.90)	(-0.90)	(-0.92)	(-0.93)	(-0.87)	(-0.93)	(-0.81)	(-0.85)	(-0.63)	(-0.60)
AGE^2	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0002	0.0002
	(1.06)	(1.08)	(1.09)	(1.11)	(1.04)	(1.11)	(0.99)	(1.04)	(0.82)	(0.82)
MALE	0.2020	0.199	0.2100	0.2058	0.2030	0.1978	0.1837	0.1910	0.1928	0.1700
	(1.41)	(1.38)	(1.46)	(1.44)	(1.41)	(1.38)	(1.28)	(1.33)	(1.34)	(1.18)
PARTNER	-0.0487	-0.0489	-0.0617	-0.0356	-0.0506	-0.0446	-0.0948	-0.0743	-0.0881	-0.0793
	(-0.29)	(-0.29)	(-0.37)	(-0.21)	(-0.31)	(-0.27)	(-0.57)	(-0.45)	(-0.53)	(-0.48)
CHILDREN	0.0203	0.0202	0.0232	0.0151	0.0180	0.0229	0.0123	0.0327	0.0309	0.0028
	(0.30)	(0.30)	(0.34)	(0.22)	(0.26)	(0.34)	(0.18)	(0.48)	(0.45)	(0.04)
SELF-EMPLOYED	0.3500	0.352	0.3610	0.3446	0.3457	0.3200	0.4919	0.3450	0.3836	0.2978
	(1.18)	(1.18)	(1.22)	(1.17)	(1.17)	(1.08)	(1.61)	(1.17)	(1.30)	(1.01)
RETIRED	-0.2800	-0.2870	-0.2859	-0.2958	-0.281	-0.2927	-0.3020	-0.2878	-0.2530	-0.2867
	(-1.02)	(-1.04)	(-1.04)	(-1.07)	(-1.02)	(-1.06)	(-1.10)	(-1.04)	(-0.93)	(-1.05)
UNIVERSITY	-0.0226	-0.0205	-0.0289	-0.0313	-0.0277	-0.0348	-0.0498	-0.0271	-0.0530	0.0176
	(-0.11)	(-0.10)	(-0.15)	(-0.16)	(-0.14)	(-0.17)	(-0.25)	(-0.14)	(-0.27)	(0.09)
LN(INCOME)	-0.2980	-0.3320	-0.3819	-0.2290	-0.3118	-0.2736	-0.4646	-0.4410	-0.6209	-0.4970
	(-0.32)	(-0.36)	(-0.41)	(-0.25)	(-0.34)	(-0.30)	(-0.48)	(-0.47)	(-0.64)	(-0.53)
LN(INCOME)^2	0.0167	0.0185	0.0212	0.0131	0.0174	0.0155	0.0264	0.0253	0.0327	0.0266
	(0.34)	(0.38)	(0.43)	(0.27)	(0.36)	(0.32)	(0.52)	(0.51)	(0.64)	(0.54)
LN(NET WORTH)	0.1856	0.1849	0.2010	0.1748	0.1878	0.1820	0.2397	0.2068	0.2310	0.2508
	(0.68)	(0.68)	(0.73)	(0.64)	(0.68)	(0.67)	(0.88)	(0.76)	(0.84)	(0.89)
LN(NET WORTH)^2	-0.0098	-0.0097	-0.0105	-0.0093	-0.0099	-0.0096	-0.0122	-0.0109	-0.0118	-0.0124
	(-0.71)	(-0.70)	(-0.75)	(-0.67)	(-0.71)	(-0.70)	(-0.88)	(-0.78)	(-0.85)	(-0.88)
N	359	359	359	359	359	359	359	359	359	359
(Pseudo) R2	0.013	0.013	0.014	0.014	0.013	0.015	0.034	0.019	0.026	0.036

Notes: Table 6 gives the results of a multivariate regression analysis. The dependent variable is *saved*. The model is estimated using a probit model. The model also includes a constant. ***, **, and *denote statistical significance at the 1%, 5%, and 10% level, respectively. Standard errors are reported in brackets beneath the coefficient.

Table 7: Values and investments in risky assets

	INVESTMENTS									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
GOD	-0.0129									
	(-0.52)									
AUTONOMY		-0.0419								
		(-0.55)								
ABORTION			0.0046							
			(0.17)							
PRIDE				0.1478						
				(1.11)						
AUTHORITY					-0.1826					
					(-0.88)					
MATERIALIST						0.0783				
						(0.55)				
UNHAPPY							0.0126			
							(0.09)			
HOMOSEXUALITY								0.0093		
								(0.38)		
PETITION									0.2390	
									(0.95)	
DISTRUST										-0.2888
										(-1.57)
AGE	-0.0336	-0.0340	-0.0337	-0.0314	-0.0365	-0.0325	-0.0339	-0.0342	-0.0374	-0.0309
	(-1.03)	(-1.04)	(-1.03)	(-0.96)	(-1.11)	(-0.99)	(-1.04)	(-1.05)	(-1.14)	(-0.93)
AGE^2	0.0004	0.0004	0.0004	0.0003	0.0004	0.0003	0.0004	0.0004	0.0004	0.0003
	(1.02)	(1.05)	(1.03)	(0.93)	(1.12)	(0.99)	(1.04)	(1.05)	(1.14)	(0.97)
MALE	-0.0322	-0.0372	-0.0340	-0.0440	-0.0379	-0.0260	-0.0307	-0.0303	-0.0266	-0.0582
	(-0.18)	(-0.20)	(-0.18)	(-0.24)	(-0.21)	(-0.14)	(-0.17)	(-0.16)	(-0.14)	(-0.32)
PARTNER	0.2928	0.3026	0.3016	0.2659	0.2910	0.2957	0.3001	0.3040	0.3065	0.2999
	(1.37)	(1.41)	(1.42)	(1.23)	(1.36)	(1.38)	(1.41)	(1.42)	(1.43)	(1.38)
CHILDREN	0.0765	0.0806	0.0782	0.0878	0.0869	0.0768	0.0789	0.0755	0.0789	0.0683
	(0.95)	(1.00)	(0.97)	(1.09)	(1.08)	(0.95)	(0.98)	(0.94)	(0.98)	(0.85)
SELF-EMPLOYED	0.6151*	0.6267*	0.6163*	0.6364**	0.6309**	0.6349*	0.6172*	0.6201*	0.607*	0.595*
	(1.91)	(1.93)	(1.93)	(2.01)	(1.97)	(1.95)	(1.92)	(1.92)	(1.87)	(1.90)
RETIRED	0.1035	0.0898	0.1045	0.1458	0.1111	0.1123	0.1038	0.1062	0.0906	0.0860
	(0.31)	(0.27)	(0.31)	(0.43)	(0.33)	(0.33)	(0.31)	(0.32)	(0.27)	(0.25)
UNIVERSITY	0.1304	0.1532	0.1408	0.1422	0.1501	0.1431	0.1408	0.1403	0.1477	0.1641
	(0.54)	(0.63)	(0.59)	(0.59)	(0.63)	(0.60)	(0.59)	(0.58)	(0.62)	(0.68)
LN(INCOME)	-0.2691	-0.1490	-0.1802	-0.5121	-0.2309	-0.2478	-0.2102	-0.2069	0.1449	-0.4021
	(-0.18)	(-0.10)	(-0.12)	(-0.36)	(-0.16)	(-0.17)	(-0.14)	(-0.14)	(0.09)	(-0.28)
LN(INCOME)^2	0.0185	0.0120	0.0137	0.0316	0.0167	0.0174	0.0153	0.0150	-0.00295	0.0254
	(0.23)	(0.14)	(0.17)	(0.40)	(0.21)	(0.22)	(0.19)	(0.19)	(-0.03)	(0.33)
LN(NET WORTH)	1.1402*	1.1091*	1.1148*	1.1533**	1.1441*	1.1288*	1.1214*	1.1039*	1.055*	1.1951**
	(1.95)	(1.89)	(1.90)	(2.02)	(1.89)	(1.95)	(1.91)	(1.89)	(1.82)	(2.01)
LN(NET WORTH)^2	-0.0402	-0.0389	-0.0392	-0.0409	-0.0405	-0.0399	-0.0395	-0.0387	-0.0366	-0.0427
	(-1.50)	(-1.45)	(-1.46)	(-1.56)	(-1.46)	(-1.50)	(-1.47)	(-1.45)	(-1.37)	(-1.57)
N	359	359	359	359	359	359	359	359	359	359
(Pseudo) R2	0.138	0.139	0.138	0.141	0.140	0.139	0.138	0.138	0.140	0.145

Notes: Table 7 gives the results of a multivariate regression analysis. The dependent variable is *investments*. The model is estimated using a probit model. The model also includes a constant. ***, **, and *denote statistical significance at the 1%, 5%, and 10% level, respectively. Standard errors are reported in brackets beneath the coefficient.

Table 8: Values and percentage invested in risky assets

	INVESTMENTS									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
GOD	-0.0047									
	(-0.40)									
AUTONOMY		-0.0356								
		(-1.14)								
ABORTION			0.0104							
			(0.96)							
PRIDE				0.0111						
				(0.19)						
AUTHORITY					0.0435					
					(0.44)					
MATERIALIST						0.0380				
						(0.64)				
UNHAPPY							0.0073			
							(0.10)			
HOMOSEXUALITY								0.0064		
								(0.65)		
PETITION									0.1171	
									(1.29)	
DISTRUST										-0.1102
										(-1.32)
AGE	-0.0121	-0.0118	-0.0115	-0.0120	-0.0115	-0.0115	-0.0122	-0.0123	-0.0143	-0.0105
	(-0.88)	(-0.84)	(-0.83)	(-0.87)	(-0.83)	(-0.83)	(-0.88)	(-0.88)	(-1.01)	(-0.77)
AGE^2	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0002	0.0001
	(1.10)	(1.10)	(1.05)	(1.11)	(1.05)	(1.05)	(1.11)	(1.11)	(1.24)	(1.02)
MALE	-0.0180	-0.0208	-0.0204	-0.0180	-0.0167	-0.0119	-0.0163	-0.0159	-0.0147	-0.0227
	(-0.23)	(-0.27)	(-0.26)	(-0.23)	(-0.21)	(-0.16)	(-0.21)	(-0.20)	(-0.19)	(-0.29)
PARTNER	0.0163	0.0218	0.0243	0.0147	0.0186	0.0169	0.0181	0.0215	0.0228	0.0145
	(0.17)	(0.22)	(0.25)	(0.15)	(0.19)	(0.17)	(0.19)	(0.22)	(0.23)	(0.15)
CHILDREN	0.0399	0.0438	0.0407	0.0417	0.0395	0.0401	0.0413	0.0388	0.0425	0.0357
	(1.14)	(1.23)	(1.18)	(1.18)	(1.11)	(1.14)	(1.19)	(1.11)	(1.22)	(1.02)
SELF-EMPLOYED	0.3581***	0.3649***	0.3472**	0.3601***	0.3588***	0.3653***	0.3577***	0.3601***	0.3504**	0.3461**
	(2.66)	(2.67)	(2.53)	(2.67)	(2.66)	(2.66)	(2.66)	(2.63)	(2.57)	(2.57)
RETIRED	-0.0041	-0.0128	0.0010	0.0004	-0.0033	0.0014	-0.0022	-0.0003	-0.0102	-0.0152
	(-0.03)	(-0.09)	(0.01)	(0.00)	(-0.02)	(0.01)	(-0.02)	(-0.00)	(-0.07)	(-0.11)
UNIVERSITY	0.0456	0.0651	0.0495	0.0488	0.0459	0.0485	0.0491	0.0478	0.0519	0.0605
	(0.44)	(0.61)	(0.48)	(0.47)	(0.43)	(0.47)	(0.47)	(0.46)	(0.50)	(0.59)
LN(INCOME)	-0.5302	-0.4118	-0.3873	-0.5165	-0.5109	-0.4912	-0.4973	-0.4851	-0.2862	-0.5719
	(-0.78)	(-0.61)	(-0.58)	(-0.77)	(-0.77)	(-0.74)	(-0.75)	(-0.73)	(-0.42)	(-0.88)
LN(INCOME)^2	0.0339	0.0274	0.0263	0.0332	0.0328	0.0319	0.0321	0.0314	0.0214	0.0360
	(0.91)	(0.74)	(0.72)	(0.90)	(0.90)	(0.88)	(0.88)	(0.86)	(0.57)	(1.00)
LN(NET WORTH)	0.9249***	0.8851***	0.9022***	0.9201***	0.9182***	0.9094***	0.9169***	0.9042***	0.8617***	0.9412***
	(2.91)	(2.82)	(2.84)	(2.89)	(2.88)	(2.88)	(2.93)	(2.84)	(2.73)	(2.89)
LN(NET WORTH)^2	-0.0354**	-0.0336**	-0.0344**	-0.0352**	-0.0351**	-0.0348**	-0.0351**	-0.0345**	-0.0326**	-0.0361**
	(-2.51)	(-2.42)	(-2.45)	(-2.50)	(-2.48)	(-2.49)	(-2.52)	(-2.45)	(-2.34)	(-2.51)
N	359	359	359	359	359	359	359	359	359	359
(Pseudo) R2	0.241	0.245	0.243	0.241	0.241	0.241	0.242	0.242	0.244	0.247

Notes: Table 8 gives the results of a multivariate regression analysis. The dependent variable is *%investments*. The model is estimated using a tobit model. The model also includes a constant. ***, **, and *denote statistical significance at the 1%, 5%, and 10% level, respectively. Standard errors are reported in brackets beneath the coefficient.

Table 9: Religion, savings and investments

	SAVED		INVESTMENTS		%INVESTMENTS	
	(1)	(2)	(3)	(4)	(5)	(6)
Religion						
CATHOLIC	0.0225	0.0981	-0.0193	-0.0382	-0.0120	-0.0311
	(0.20)	(0.52)	(-0.14)	(-0.17)	(-0.14)	(-0.35)
PROTESTANT	0.1571	0.3162	-0.0227	0.0707	-0.0101	0.0155
	(1.15)	(1.54)	(-0.14)	(0.30)	(-0.10)	(0.15)
AGE		-0.0262		-0.0345		-0.0124
		(-0.93)		(-1.05)		(-0.89)
AGE^2		0.0003		0.0004		0.0002
		(1.10)		(1.06)		(1.12)
MALE		0.1988		-0.0349		-0.0181
		(1.39)		(-0.19)		(-0.23)
PARTNER		-0.0431		0.2992		0.0164
		(-0.26)		(1.41)		(0.17)
CHILDREN		0.0254		0.0806		0.0417
		(0.37)		(1.00)		(1.19)
SELF-EMPLOYED		0.3672		0.6278*		0.3642***
		(1.24)		(1.95)		(2.67)
RETIRED		-0.2949		0.0913		-0.0101
		(-1.06)		(0.27)		(-0.07)
UNIVERSITY		-0.0082		0.1438		0.0506
		(-0.04)		(0.60)		(0.48)
LN(INCOME)		-0.1353		-0.1088		-0.4564
		(-0.15)		(-0.07)		(-0.67)
LN(INCOME)^2		0.0081		0.0100		0.02992
		(0.16)		(0.12)		(0.80)
LN(NET WORTH)		0.1646		1.1148*		0.9193***
		(0.60)		(1.90)		(2.91)
LN(NET WORTH)^2		-0.0088		-0.0392		-0.0352**
		(-0.64)		(-1.46)		(-2.52)
N	874	359	874	359	874	359
(Pseudo) R2	0.0011	0.0174	0.0000	0.1381	0.0000	0.2410
H0: P=C=0	1.33	2.46	0.03	0.14	0.01	0.08
H0:P=C	0.69	0.72	0.00	0.14	0.00	0.14

Notes: Table 9 gives the results of a multivariate regression analysis. The dependent variables are *saved*, *investment*, and *%investments*. The first two models are estimated using a probit model and the third model is estimated using a tobit model. The model also includes a constant. We report two sets of results. First, a model including only the religion variables. Second, a model including all religion and control variables. At the bottom we show the results of a chi-square Wald test on the joint significance and equality of the variables Catholic and Protestant.***, **, and *denote statistical significance at the 1%, 5%, and 10% level, respectively. Standard errors are reported in brackets beneath the coefficient.

References

Abel, A. B. (2001). The effects of investing social security funds in the stock market when fixed costs prevent some households from holding stocks. *American Economic Review*, 128–148.

Allport, G. W., P. E. Vernon, and G. Lindzey (1960). *Study of values*. Oxford, England: Houghton Mifflin.

Antonides, G., I. Manon de Groot, and W. Fred van Raaij (2011). Mental budgeting and the management of household finance. *Journal of Economic Psychology 32*(4), 546–555.

Arruñada, B. (2010). Protestants and catholics: Similar work ethic, different social ethic*. *The Economic Journal 120*(547), 890–918.

Au, K. Y. (1999). Intra-cultural variation: Evidence and implications for international business. *Journal of International Business Studies 30*(4), 799–812.

Bonaparte, Y. and A. Kumar (2013). Political activism, information costs, and stock market participation. *Journal of Financial Economics 107*(3), 760–786.

Brav, A., G. M. Constantinides, and C. C. Geczy (2002). Asset pricing with heterogeneous consumers and limited participation: Empirical evidence. *Journal of Political Economy 110*(4), 793–824.

Brown, J. R., Z. Ivković, P. A. Smith, and S. Weisbenner (2008). Neighbors matter: Causal community effects and stock market participation. *The Journal of Finance 63*(3), 1509–1531.

Brown, S. and K. Taylor (2014). Household finances and the 'big five' personality traits. *Journal of Economic Psychology 45*, 197 – 212.

Campbell, J. Y. (2006). Household finance. *The Journal of Finance 61*(4), 1553–1604.

Cherchye, L., B. De Rock, and F. Vermeulen (2012). Married with children: A collective labor supply model with detailed time use and intrahousehold expenditure information. *The American Economic Review 102*(7), 3377–3405.

Christelis, D., T. Jappelli, and M. Padula (2010). Cognitive abilities and portfolio choice. *European Economic Review 54*(1), 18–38.

Chui, A. C., S. Titman, and K. J. Wei (2010). Individualism and momentum around the world. *The Journal of Finance 65*(1), 361–392.

Datler, G., W. Jagodzinski, and P. Schmidt (2013). Two theories on the test bench: Internal and external validity of the theories of ronald inglehart and shalom schwartz. *Social Science Research 42*(3), 906–925.

Davidov, E., B. Meuleman, J. Billiet, and P. Schmidt (2008). Values and support for immigration: A cross-country comparison. *European Sociological Review 24*(5), 583–599.

Ditz, G. W. (1980). The protestant ethic and the market economy. *Kyklos 33*(4), 623–657.

Dobewall, H. and R. Maksim (2012). Common and unique features of schwartz's and inglehart's value theories at the country and individual levels. *Political Psychology 32*(4), 537–561.

Georgarakos, D. and G. Pasini (2011). Trust, sociability, and stock market participation. *Review of Finance 15*(4), 693–725.

Guiso, L., P. Sapienza, and L. Zingales (2008). Trusting the stock market. *The Journal of Finance 63*(6), 2557–2600.

Hackett, C., P. Connor, M. Stonawski, V. Skirbekk, M. Potancoková, and G. Abel (2015). The future of world religions: Population growth projections, 2010-2050. *Washington, DC, Pew Research Center*.

Hofstede, G. (1980). *National cultures in four dimensions: A research-based theory of cultural differences among nations*. Sage Publications, Inc.

Hong, H., J. D. Kubik, and J. C. Stein (2004). Social interaction and stock-market participation. *The Journal of Finance 59*(1), 137–163.

Inglehart, R. (1971). The silent revolution in europe: Intergenerational change in post-industrial societies. *American Political Science Review 65*(4), 991–1017.

Inglehart, R. (1977). *The silent revolution: Changing values and political styles among western publics*. Princeton University Press.

Inglehart, R. (1997). *Modernization and postmodernization: Cultural, economic, and political change in 43 societies*. Cambridge University Press.

Inglehart, R. and W. E. Baker (2000). Modernization, cultural change, and the persistence of traditional values. *American Sociological Review 65*(1), 19–51.

Inglehart, R. and D. Oyserman (2004). Individualism, autonomy, self-expression. the human development syndrome. In H. Vinken, J. Soeters, and P. Ester (Eds.), *Comparing cultures: Dimensions of culture in a comparative perspective*. Leiden, The Netherlands: Brill.

Inglehart, R. and C. Welzel (2005). *Modernization, cultural change, and democracy: The human development sequence*. Cambridge University Press.

Jagodzinski, W. (2010). The validity of secular-rational and self-expression values. Paper presented at the Symposium on Value Change and Value Measurement.

Kaplanski, G., H. Levy, C. Veld, and Y. Veld-Merkoulova (2015). Past returns and the perceived sharpe ratio. *Journal of Economic Behavior & Organization*.

Kumar, A., J. K. Page, and O. G. Spalt (2011). Religious beliefs, gambling attitudes, and financial market outcomes. *Journal of Financial Economics 102*(3), 671–708.

Li, K., D. Griffin, H. Yue, and L. Zhao (2013). How does culture influence corporate risk-taking? *Journal of Corporate Finance 23*, 1–22.

Merkle, C., D. P. Egan, and G. B. Davies (2014). Investor happniess. *SSRN Working Paper*.

Puri, M. and D. T. Robinson (2007). Optimism and economic choice. *Journal of Financial Economics 86*(1), 71–99.

Renneboog, L. and C. Spaenjers (2012). Religion, economic attitudes, and household finance. *Oxford Economic Papers 64*(1), 103–127.

Rokeach, M. (1973). *The nature of human values*. New York: Free Press.

Rokeach, M. and S. J. Ball-Rokeach (1989). Stability and change in american value priorities, 1968–1981. *American Psychologist 44*(5), 775.

Sagiv, L. and S. H. Schwartz (1995). Value priorities and readiness for out-group social contact. *Journal of Personality and Social Psychology 69*(3), 437.

Scherpenzeel, A. (2011). Data collection in a probability-based internet panel: how the liss panel was built and how it can be used. *Bulletin of Sociological Methodology/Bulletin de Méthodologie Sociologique 109*(1), 56–61.

Schwartz, S. H. (1992). Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries. In M. Zanna (Ed.), *Advances in experimental social psychology*, Volume 25, pp. 1 – 65. New York: Academic Press.

Schwartz, S. H. (1999). A theory of cultural values and some implications for work. *Applied Psychology 48*(1), 23–47.

Shu, T., J. Sulaeman, and P. E. Yeung (2012). Local religious beliefs and mutual fund risk-taking behaviors. *Management Science 58*(10), 1779–1796.

Siegel, J. I., A. N. Licht, and S. H. Schwartz (2011). Egalitarianism and international investment. *Journal of Financial Economics 102*(3), 621–642.

Thaler, R. H. (1994). Psychology and savings policies. *The American Economic Review*, 186–192.

Tung, R. L. (2008). The cross-cultural research imperative: The need to balance cross-national and intra-national diversity. *Journal of International Business Studies 39*(1), 41–46.

Van Rooij, M. C., A. Lusardi, and R. J. Alessie (2011). Financial literacy and retirement planning in the netherlands. *Journal of Economic Psychology 32*(4), 593–608.

von Ophem, H. and P. Berkhout (2012). Adverse selection and moral hazard in the choice of a deductible in health costs insurance: an empirical analysis on dutch data. *Working Paper, University of Amsterdam*.

Welzel, C. (2010). How selfish are self-expression values? A civicness test. *Journal of Cross-Cultural Psychology 41*(2), 152–174.

Westerhof, G. J. and C. L. Keyes (2010). Mental illness and mental health: The two continua model across the lifespan. *Journal of Adult Development 17*(2), 110–119.

Williams, R. et al. (2012). Using the margins command to estimate and interpret adjusted predictions and marginal effects. *Stata Journal 12*(2), 308–331.

Williams, R. M. (1968). Values. In E. Sills (Ed.), *International encyclopedia of the social sciences*. New York: Macmillian.